

Amendment and Response

Applicant: Gottfried Beer et al.

Filed: March 10, 2004

Serial No.: 10/797,365

Docket No.: I431.104.101/FIN 429 US

Title: MODULE HAVING A CIRCUIT CARRIER AND AN ELECTRO-OPTICAL TRANSDUCER AND METHOD FOR PRODUCING THE SAME

IN THE CLAIMS

Please amend claims 1, 14, 15 and 19 as follows:

1. (Currently Amended) A module having a circuit carrier and having an electro-optical transducer mounted thereon, the electro-optical transducer comprising:

an optical waveguide holder having an optical waveguide receptacle, an end side and a mounting area on an edge side of the optical waveguide holder;

an optoelectronic component having an optically active region on an active top side of a semiconductor chip, and having a housing with a housing outer edge side ~~in elongation of the mounting area~~, on which is arranged at least one contact area for electrically connecting the semiconductor chip to the circuit carrier; and

wherein the optoelectronic component is arranged with its optically active region on ~~an~~ the end side of the optical waveguide holder in such a way that the optical waveguide receptacle and the optically active region are oriented ~~with respect to~~ facing one another; ~~and~~

wherein the mounting area is ~~mounted~~ arranged essentially at right angles with respect to the end side on the circuit carrier;

wherein the end side of the optical waveguide holder is mounted essentially at right angles with respect to the top side of the circuit carrier; and

wherein the at least one contact area of the optoelectronic component is oriented facing the top side of the circuit carrier.

2. (Original) The module of claim 1, wherein the module has an optoelectronic transducer at a module input and the electro-optical transducer at a module output.

3. (Original) The module of claim 1, wherein the circuit carrier is populated with at least one electronic component and with a semiconductor chip that has an integrated circuit.

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4. (Original) The module of claim 1, wherein the optoelectronic component has at least one semiconductor chip, which is connected to inner sections of flat conductors on its active top side, outer sections of the flat conductors being arranged on one side at an individual housing outer edge and having the contact area accessible on the edge side.
5. (Original) The module of claim 1, wherein the optoelectronic component has a semiconductor chip, which has a rewiring plate on its active top side with the optically active region being left free, incipiently cut through contacts of the rewiring plate being arranged at an individual housing outer edge and having the contact areas accessible on the edge side.
6. (Original) The module of claim 1, wherein the contact area has a solder deposit.
7. (Original) The module of claim 1, wherein the contact area has an external contact.
8. (Original) The module of claim 1, wherein the circuit carrier has a printed circuit board.
9. (Original) The module of claim 1, wherein the circuit carrier has a multilayer ceramic substrate.
10. (Original) The module of claim 1, wherein the circuit carrier has a flexible multilayer conductor track sheet.
11. (Original) The module of claim 1, wherein the optoelectronic component has, as the semiconductor chip, a laser diode.
12. (Original) The module of claim 1, wherein the optoelectronic component has, as the semiconductor chip, a light-emitting diode.

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13. (Original) The module of claim 1, wherein the optoelectronic component has, as the semiconductor chip, a photodiode.

14. (Currently Amended) The module of claim 1, wherein the ~~radiation guide~~ waveguide holder has a mechanical supporting element arranged at the end side.

15. (Currently Amended) A method for producing an electro-optical transducer comprising:
die-casting an optical waveguide holder having an end side and molding-in an optical waveguide receptacle toward the end side and molding-on a mounting area on an edge side of the optical waveguide holder at right angles with respect to the end side;

producing an optoelectronic component, including:

applying at least one semiconductor chip having an optically active region to a rewiring structure comprising flat conductors;

connecting the optoelectronic component to the flat conductors via conductor tracks;

forming at least one contact area of a flat conductor, said contact area being arranged on a housing outer edge side; and

packaging the optoelectronic component in a housing with the contact area being left free; and

applying the optoelectronic component to the end side of the optical waveguide holder ~~with orientation of~~ such that the contact area in elongation of is essentially parallel with the mounting area and ~~with orientation of~~ such that the optical waveguide receptacle with respect to faces the optically active region; and

mounting the optical waveguide holder on a top side of a circuit carrier such that the end side of the optical waveguide holder is essentially at right angles with respect to the top side of the circuit carrier;

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16. (Original) The method of claim 15, wherein the conductor tracks of the semiconductor chip are electrically connected to the flat conductors by means of bonding technology via bonding wires.

17. (Original) The method of claim 15, wherein the semiconductor chip is adhesively bonded onto inner sections of flat conductors of a flat leadframe.

18. (Original) The method of claim 15, wherein the optoelectronic component is adhesively bonded onto the end side of the optical waveguide holder.

19. (Currently Amended) A method for producing a module having a circuit carrier and an electro-optical transducer, comprising:

die-casting an optical waveguide holder having an end side and molding-in an optical waveguide receptacle toward the end side and molding-on a mounting area on an edge side of the optical waveguide holder at right angles with respect to the end side;

producing an optoelectronic component, including:

applying at least one semiconductor chip having an optically active region to a rewiring structure comprising flat conductors;

connecting the optoelectronic component to the flat conductors via conductor tracks;

forming at least one contact area of a flat conductor, said contact area being arranged on a housing outer edge side; and

packaging the optoelectronic component in a housing with the contact area being left free;

applying the optoelectronic component to the end side of the optical waveguide holder

~~with orientation of such that the contact area in elongation of is essentially parallel with the mounting area and with orientation of such that the optical waveguide receptacle with respect to~~
faces the optically active region;

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bonding the mounting side of the electro-optical transducer onto an edge region of the circuit carrier such that the end side of the optical waveguide holder is essentially at right angles with respect to a top side of the circuit carrier; and

connecting the contact area of the electro-optical transducer to a circuit carrier line.

20. (Original) The method of claim 19, wherein the contact area is soldered to a circuit carrier line.